

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-20. (Canceled)

21. (Currently Amended) An apparatus for cleaning an assembled irradiated nuclear fuel assembly, comprising:

an elongated housing having an opening at a first end and a length, wherein said opening is configured to receive, and said length is configured to be at least as long as, ~~an~~ said assembled irradiated nuclear fuel assembly ~~to be received by said elongated housing~~; and

a plurality of ultrasonic omnidirectional transducers positioned on said housing, each comprising:

a first end;

a second end; and

a rod disposed between said first end and said second end, said rod configured to emanate omnidirectional ultrasonic energy waves;

wherein said first end and said second end are attached to said elongated housing.

22. (Canceled)

23. (Canceled)

24. (Currently Amended) The apparatus of claim 21, wherein said plurality of ultrasonic omnidirectional transducers is positioned along the entire length of said housing.

25. (Currently Amended) The apparatus of claim 21, wherein said rod of each of said plurality of ultrasonic omnidirectional transducers comprises an elongated rod ~~having a first end and a second end, wherein each of said ultrasonic transducers further comprises a first transducer at said first end and a second transducer at said second end, and wherein each of said elongated rods~~ is positioned substantially parallel to the length of said housing.

26. (Currently Amended) The apparatus of claim 25, wherein said plurality of ultrasonic omnidirectional transducers is positioned along the entire length of said housing.

27-28. (Canceled)

29. (Previously Presented) The apparatus of claim 21, wherein said housing is configured to receive an irradiated boiling water reactor nuclear fuel assembly.

30. (Currently Amended) The apparatus of claim 21, wherein said elongated housing further comprises a reflector that comprises:
a circular cylindrical inner reflecting surface positioned around a periphery of said housing; and
a circular cylindrical outer reflecting surface positioned around a periphery of said circular cylindrical inner reflecting surface and forming a gap between

said ~~circular~~ cylindrical inner reflecting surface and said ~~circular~~ cylindrical outer reflecting surface.

31. (Currently Amended) An apparatus for cleaning an assembled irradiated nuclear fuel assembly, comprising:

an elongated housing configured to receive said assembled irradiated nuclear fuel assembly; and

a plurality of ultrasonic omnidirectional transducers positioned on said elongated housing, each comprising:

a first end;

a second end; and

a rod disposed between said first end and said second end, said rod configured to emanate omnidirectional ultrasonic energy waves having a node structure that is an approximate multiple of a spacing between the fuel rods of an said assembled irradiated nuclear fuel assembly ~~to be received by said elongated housing;~~

wherein said first end and said second end are attached to said elongated housing.

32. (Previously Presented) The apparatus of claim 31, wherein said approximate multiple is one.

33. (Previously Presented) The apparatus of claim 31, wherein said elongated housing further comprises a reflector that comprises:

a cylindrical inner reflecting surface positioned around a periphery of said elongated housing; and

a cylindrical outer reflecting surface positioned around a periphery of said cylindrical inner reflecting surface and forming an air gap between said cylindrical inner reflecting surface and said outer reflecting surface.

34. (Currently Amended) An apparatus for cleaning an assembled, four-sided irradiated nuclear fuel assembly, comprising:

an elongated housing to receive said assembled irradiated nuclear fuel assembly;

at least four pluralities of a plurality of ultrasonic omnidirectional transducers, wherein each of said ultrasonic transducers comprises a rod configured to emanate omnidirectional ultrasonic energy waves and further wherein:

a first subset of said plurality of ultrasonic omnidirectional transducers and wherein each one of said at least four pluralities of ultrasonic transducers is positioned on said elongated housing such that each one of said at least four pluralities of ultrasonic transducers is and configured to be adjacent to a different first one of four side[[s]] of an said assembled irradiated nuclear fuel assembly to be received by said elongated housing;

a second subset of said plurality of ultrasonic omnidirectional transducers is positioned on said elongated housing and configured to be adjacent to a second side of said assembled irradiated nuclear fuel assembly;

a third subset of said plurality of ultrasonic omnidirectional transducers is positioned on said elongated housing and configured to be adjacent to a third side of said assembled irradiated nuclear fuel assembly; and

a fourth subset of said plurality of ultrasonic omnidirectional transducers is positioned on said elongated housing and configured to be adjacent to a fourth side of said assembled irradiated nuclear fuel assembly;

wherein said elongated housing comprises a reflector comprising:

 a circular cylindrical inner reflecting surface positioned around a periphery of said elongated housing; and

 a circular cylindrical outer reflecting surface positioned around a periphery of said circular cylindrical inner reflecting surface and forming an air gap between said circular cylindrical inner reflecting surface and said circular cylindrical outer reflecting surface.

35. (Currently Amended) The apparatus of claim 34, wherein the length of said elongated housing extends in a predetermined longitudinal first direction and further wherein the length of each of said rods plurality of ultrasonic omnidirectional transducers is positioned substantially parallel to said predetermined longitudinal first direction.

36. (Canceled)

37. (Currently Amended) An apparatus for cleaning an assembled irradiated nuclear fuel assembly, comprising:

 a housing having an opening at a first end and a length, wherein said opening is configured to receive, and said length is configured to be at least as long as, said assembled irradiated nuclear fuel assembly; and

 a plurality of ultrasonic transducers positioned on said housing, each comprising a rod wherein said opening is configured to receive, said length is

~~configured to be at least as long as, and said rod of each of said ultrasonic transducers is configured to emanate omnidirectional ultrasonic energy waves having a node structure that is an approximate multiple of a spacing between the fuel rods of[.] an said assembled irradiated nuclear fuel assembly to be received by said housing.~~

38. (Currently Amended) The apparatus of claim 37, wherein said plurality of ultrasonic omnidirectional transducers is positioned along an entirety of said length of said housing.

39. (Previously Presented) The apparatus of claim 37, wherein said approximate multiple is one.

40. (Currently Amended) The apparatus of claim 37, wherein said housing further comprising a reflector that comprises:
a circular cylindrical inner reflecting surface positioned around a periphery of said stationary housing; and
a circular cylindrical outer reflecting surface positioned around a periphery of said inner reflecting surface, in which an air gap is positioned between said inner reflecting surface and said outer reflecting surface.

41. (New) The apparatus of claim 31, wherein each of said plurality of ultrasonic omnidirectional transducers is configured to emanate ultrasonic energy waves with a period equal to an approximate multiple of the spacing between the fuel rods of said assembled irradiated nuclear fuel assembly.